



Forest Health Protection Pacific Southwest Region



Date: August 17, 2009
File Code: 3420

To: Patricia Grantham, Forest Supervisor, Klamath National Forest and
Ken Harris, District Ranger, Happy Camp/Oak Knoll District

Subject: Port-Orford-Cedar Root Disease update for Clear Creek Drainage, Siskiyou
Wilderness (FHP Report Number N09-10)

At the request of Carol Sharp, Silviculturist, Klamath National Forest, Cynthia Snyder, Forest Health Protection (FHP) Entomologist, conducted a field evaluation of Port-Orford-Cedar (POC) in the upper Clear Creek Drainage in the Siskiyou Wilderness on July 22-23, 2009. The objective of the visit was to evaluate the current condition of the POC along the Clear Creek Trail between the Young's Valley trailhead and the junction with the Rattlesnake Meadows trail, the Raspberry Lake Trail and along the creek linking Raspberry Lake and Clear Creek. Based on this information, determine what influence these conditions have on management objectives and provide recommendations as appropriate.

Background

In August 2006, Dave Schultz, FHP Entomologist, and Pete Angwin, FHP Pathologist, hiked approximately 30 miles from the Young's Valley Trailhead downstream to the Clear Creek Trailhead in the Clear Creek watershed in the Siskiyou Wilderness Area. The purpose of the trip was to determine the condition of the Port-Orford-cedar in the Clear Creek drainage. Dead and dying POC were found in several locations near the trail (Figure 1) and presence of POC root disease was identified by removing bark from the roots and lower bole to reveal diagnostic cinnamon-brown discoloration coming up from the roots (Figure 2). Subsequent PRC analysis confirmed the presence of *Phytophthora lateralis* in the diseased POC. The first confirmed location was located 6.3 miles down from the Young's Valley trailhead (waypoint P40) with additional confirmed locations further downstream.

Improvements to reduce the likelihood of introduction of *P. lateralis* into the Clear Creek watershed had been made at the three trailheads entering the Wilderness Area prior to the 2006 discovery of POC root disease. The means of the initial introduction is still the

NORTHERN CALIFORNIA SHARED SERVICE AREA
3644 AVTECH PARKWAY, REDDING, CA 96002
530-262-2437

Cynthia Snyder, Entomologist
clsnyder@fs.fed.us

Pete Angwin, Plant Pathologist
pangwin@fs.fed.us



Figure 1. 2006 POC root disease survey map.



Figure 2. Typical cinnamon-brown staining of *Phytophthora lateralis*.

subject of speculation. A second trip along the trail was conducted in September 2006 by Dave Schultz and Carol Sharp, Silviculturist, Klamath National Forest, concentrating on the area upstream of waypoint P40. No additional POC root disease was located between waypoint P40 and the Young's Valley trailhead.

In 2009, an interregional POC/*P. lateralis* mapping and inventory project was undertaken entailing a detailed analysis of existing aerial photographs (circa 1999) on five national forests across two regions and included the Siskiyou Wilderness Area (national GIS contract, Frank Betlejewski, COR). While updating existing attribute tables, Jim Nielsen (president, Woodland forestry Inc., Coquille, OR) identified a typical POC root disease pattern along the stream channel about 1,500 feet downstream from Raspberry Lake within the Preston Peak Botanical Area, an area not investigated on the previous trips into the Siskiyou Wilderness Area. This stream empties into Clear Creek near waypoint P40. Based on this new information, the current trip into the Wilderness was initiated to look at the POC conditions along the Raspberry Lake trail and along the stream between Raspberry Lake and Clear Creek.

Observations

On July 22, 2009, Cynthia Snyder, accompanied by Jackie Duran, California Conservation Corps, hiked from Young's Valley to Raspberry Lake via the Raspberry Lake trail. No POC root disease was located, although several locations along the trail were identified for improvement to protect the area from introduction of the disease. Of particular concern were places where the trail crosses through stands of mature POC where springs emerge from the cutbanks and create muddy conditions on the trail

(Figure 3). Such conditions are ideal for the deposition of pathogen-infested mud from hikers' boots and pack animals' hooves.

The Raspberry Lake shoreline was clear of evidence of POC root disease. The area between the lake and the sites identified on aerial photos were likewise clear of POC root disease. The POC root disease center 1,500 feet below Raspberry Lake identified by Jim Nielsen was confirmed with many large and medium sized, older-dead POC along a slow-moving off-shoot of the main creek flowing out of Raspberry Lake (waypoint 031, Figure 4). The root disease center was approximately 5 acres in size with dense standing dead POC mixed with smaller apparently healthy POC, a few younger fading POC indicating active infection, and mixed aged white fir. Slow moving water hidden by thick rose, willow, fern, and assorted hardwood and herbaceous species moved through the root disease center. Fading and recently dead POC exhibited the stain pattern typical of POC root disease. Dead POC also had evidence of amethyst cedar bark borer (*Semanotus amethystinus*).



Figure 3. Spring crossing trail under mature POC.



Figure 4. POC root disease center approximately 1,500 feet downstream from Raspberry Lake.

While it is still unclear how the infection originally entered the Clear Creek watershed, it now appears that it may have originated in the stream between Raspberry Lake and Clear Creek. However, this stream does not currently have, nor does it appear to ever had, trail access. The current root disease center appears to be quite old, but smaller, newer disease pockets with one or two dead or diseased trees are scattered down the length of the creek (Figure 5). Samples of stained bark and wood were taken from four sites and sent to Oregon State University for PRC confirmation of *P. lateralis*. Field tests performed using a pocket Elisa diagnostic kit (forsite diagnostics, York, UK) confirmed the presence of a *Phytophthora* in POC at one site (waypoint 32).

There is still no evidence of POC root disease along Clear Creek from the confluence of the stream from Raspberry Lake to the Young's Valley trailhead. California Conservation Corps (CCC) in conjunction with AmeriCorps are currently working with the Forest Service to complete the trail improvements recommended after the 2006 surveys (FHP Report N06-06) as well as other non-specified trail improvements on the main Clear Creek Trail and connecting trails including the Raspberry Lake Trail.

Discussion and Recommendations

As noted in 2006, the POC root disease infestation is too widespread and well established for pathogen eradication to be considered as a viable management option. However, actions to limit the spread of the disease, particularly in areas upstream of the current infection sites, may be taken. Recommended treatments include improving drainage and armoring trails near POC to reduce the pickup and deposition of infected mud on hikers' boots and pack animals' hooves. Planting of disease-resistant POC may also be encouraged. CCC crews are currently working on trail improvements and a second visit may be planned to further evaluate the work along the trails in the Clear Creek drainage and take additional samples for analysis from root disease centers between Raspberry Lake and Clear Creek. Management recommendations for specific sites and observed trail improvements are given in the following table.

<u>Waypoint Number</u>	<u>Coordinates</u>	<u>Comments</u>
020	N41 52.736 W123 37.513	Dry creek crossing, healthy POC, Would benefit from new waterbar/crossing
021	N41 52.522 W123 37.371	Bell Echo Campsite, healthy POC, Would benefit from armoring trail near dry crossings
022	N41 52.471 W123 37.504	Springs crossing trail, healthy POC, Would benefit from drainage improvement
023	N41 52.260 W123 37.555	Springs crossing trail, healthy POC, Would benefit from drainage improvement
024	N41 52.046 W123 37.561	Wet trail section, no POC present, Would benefit from drainage improvement
025	N41 51.880 W123 37.422	Springs crossing trail, no POC, May benefit from drainage improvement to protect any POC that may be downstream
026	N41 51.446 W123 37.177	Dry creek crossing, healthy POC, Would benefit from new waterbar/crossing
027	N41 51.394 W123 37.177	Dry creek crossing, healthy POC, Would benefit from new waterbar/crossing
028	N41 51.346 W123 37.177	Springs crossing trail, no POC, Would benefit from drainage improvement
029	N41 50.993 W123 37.268	Raspberry Lake, no POC at this site along lake
030	N41 50.980 W123 37.301	Head of creek, healthy POC
031	N41 51.117 W123 37.453	Large POC root disease center, no trail access so no improvements needed
032	N41 51.125 W123 37.503	Large POC root disease center, no trail access so no improvements needed Positive Elisa test for <i>Phytophthora</i>
033	N41 51.177 W123 37.525	Healthy POC along creek, dead DF, no trail access so no improvements needed
034	N41 51.189 W123 37.548	Dead POC – also fire scarred, beetle-infested, and downed, no trail access so no improvements

		needed
035	N41 51.241 W123 37.601	Many healthy young POC along creek, no trail access so no improvements needed
036	N41 51.401 W123 37.866	2 dead POC along creek, no trail access so no improvements needed
037	N41 51.460 W123 38.036	3 dead POC along creek, no trail access so no improvements needed
038	N41 51.527 W123 38.178	4 dead POC along creek, no trail access so no improvements needed
039	N41 51.531 W123 38.211	End of creek at junction of Clear Creek and Rattlesnake Meadows trails, 1 dead POC in creek, no trail access so no improvements needed
Current Trail Improvements (July 23, 2009)		
041	N41 52.744 W123 37.863	Rebuilding waterbars
042	N41 52.713 W123 37.872	Rebuilding waterbars
043	N41 52.623 W123 37.831	Rebuilding waterbars
044	N41 52.604 W123 37.831	Wet spot in trail Causeway to be built by volunteer group in 2009
045	N41 52.596 W123 37.837	Stream crossing, healthy POC, CCC building retaining walls to prevent trail erosion and placing new creek crossing stones
046	N41 52.555 W123 37.874	Rebuilding waterbars
047	N41 52.454 W123 37.988	Rebuilding waterbars
048	N41 52.408 W123 38.175	Building new waterbreak to prevent trail erosion
049	N41 52.231 W123 38.180	Rebuilding waterbars
050	N41 52.077 W123 38.166	Rerouting trail, building retaining walls, placing stepping stones across wet section of trail with healthy POC

Summary

Treatment should be implemented as soon as possible to minimize the risk of further POC root disease spread in the Clear Creek watershed. Current efforts underway include a small eradication at waypoint P40 and trail improvements along Clear Creek from Young's Valley trailhead south to the Clear Creek trailhead. Trail improvements include rerouting the trail in places and rebuilding stream crossings, causeways and waterbars on the Clear Creek trail and connecting trails within the Clear Creek watershed.

If you have any questions regarding this report and/or need additional information please contact Cynthia Snyder at 530-226-2437 or Pete Angwin at 530-226-2436.

/s/ Cynthia Snyder

Cynthia Snyder
Entomologist
Northern CA Shared Services Area

cc: Carol Sharp, Todd Drake, Max Creasy, Roger Siemers, Dan Blessing,
Chuck Frank, Ken Neeley, Roy Bergstrom, Frank Betlejewski, Julie Lydick, Phil
Canon, Sheri Smith, Mary K. Vandiver, Pete Angwin